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Some observations on the spectra of nebulæ, and on the motion of stars in the line of sight, are at present not completed; but it is expected that the velocity of *Sirius* from the Earth will be found to be smaller than the estimate which Mr. Huggins obtained with the less powerful instruments then at his command.

Some quite recent observations of the change of refrangibility of the Fraunhofer lines at the opposite limbs of the Sun appear to show a motion in the atmosphere producing the Fraunhofer lines greater than that which is indicated for the photosphere by the movements of the spots.

Mr. Bishop's Observatory.

The principal work of the past year has been the continuation of the charts or stars within three degrees north and south of the ecliptic, to the eleventh magnitude inclusive. It has been found necessary to introduce a considerable increase in the measure of the square degree for those parts of the ecliptic where it is traversed by the Galaxy, in order to show distinctly the great number of small stars which the charts include. Much additional zone-work has also been required, but the whole is now in a sufficiently advanced state to allow of the re-issue of the charts commencing in the present month, with the hope of maintaining a regular publication during the year. In this district, the nights available for small-star-work have been by no means up to the average. Encke's comet has been satisfactorily observed for position on sixteen nights up to December 6. The small comet, discovered by M. Tempel, on November 3, was observed on four nights. It is Mr. Bishop's intention to combine calculation, with observation, in the proceedings of his Observatory. During the past year a full discussion of the observations of the Great Comet of 1861 has been completed by Mr. W. E. Plummer: the number of observations approaches one thousand; all sensible planetary perturbations have been taken into account, and the final orbit depends upon normals on which the whole of the observations about the respective dates have been brought to bear. The main result of the investigation is to indicate that the comet was moving in an ellipse with a period of 402 years; the details are now in course of arrangement for publication. Upon the suggestion of Mr. Hind, Mr. Bishop has undertaken the calculation of the effect of planetary attraction upon Encke's comet during the next revolution, and hence the preparation of an ephemeris for the reappearance in the spring of 1875. Very little has been done in England in this department of astronomy, and although it has been announced by the German Astronomical Society that an experienced computer proposes to occupy himself with a similar investigation, it appears to be intended to apply a new method, and it will be at least satisfactory in this case to possess a duplicate calculation. Mr. Plummer is now engaged in the preliminary correction of the predicted elements from the observations of 1871, after which he will apply

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with every accuracy the method of computation indicated by the Astronomer Royal, with certain modifications to suit this particular case. An ephemeris of Tuttle's comet, of short period, for the Southern hemisphere, was issued from this observatory, by the aid of which Mr. Stone had been able to observe it at the Cape of Good Hope in the middle of December. The periodical comet of De Vico, which has not been detected since its appearance in 1844, has been sought for on the assumption that a perihelion passage might take place in the autumn of 1871. It now appears probable that this did not occur between August and November.

Royal Observatory, Cape of Good Hope.

The chief attention of the staff has been directed to the reduction and passing through the press of the observations made with the Transit-Circle, in order to bring forward a catalogue of stars from observations made since the erection of that instrument. The Transit-Circle was brought systematically into use in 1856. The observations made in that year have been reduced, printed, and distributed. The observations made in 1857 have been printed, Those in 1858 have been partially printed. The reductions of the observations made in 1859 are in a forward state. The meteorological observations from 1841 to 1870 have been collected, discussed, and the results printed and distributed. The miscellaneous magnetical observations, not hitherto printed, have been collected, reduced when necessary, the means taken, and the results prepared for press. It is intended to append these miscellaneous observations to the volume containing the results for 1857 and 1858, which it is hoped may soon be ready for distribution.

The work of the Observatory has been much impeded since August by the illness, at one time, of no less than three of the staff, and the lamented death, on September 18, of Mr. Sinfield, an assistant of considerable experience and much promise. Much time has been devoted to the examination of the form of the pivots and the division-errors of the Transit-Circle. The observing with the Transit-Circle has been chiefly directed to observations of the zenith distance of circumpolar stars, wide and close, both above and below pole, to afford material for a separation of any existing errors in the refractions adopted, and the colatitude of the observatory. Observations of *α Centauri*, *β Centauri*, and *α Eridani*, have been made to test the truth of the reference of a large systematic annual change in the zenith distances of *α Centauri*, observed at this observatory, to annual parallax.

A complete reobservation of all stars down to the seventh magnitude within 5° of the South Pole has also been made. Each star has been observed at least three times.

The Equatoreal has been employed upon observations of Winnecke's Comet I. 1871, Tuttle's comet, and a reobservation of many of Herschel's double stars. A few attempts have been

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